

Boyleston Bridge  
Jackson Township  
Henry County  
Iowa

HAER No. IA-5

HAER  
IOWA,  
44-JACTOS,

1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Rocky Mountain Regional Office  
Department of the Interior  
P.O. Box 25287  
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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HAER No. IA-5

Location: Northeast quarter of the Northwest quarter of  
Section 25, Township 70 North, Range 3 West of the  
5th Parallel Meridian  
Jackson Township, Henry County, Iowa

UTM: North End - 15.626308.4521960  
South End - 15.626312.4521790  
Quad: Salem

This bridge carries County W75 over the Skunk River.

Date of Construction: Begun in 1896; completed in 1897

Present Owner: Henry County Board of Supervisors  
Mt. Pleasant, Iowa

Present Use: Vehicular traffic

Significance: The Boyleston Bridge is a rare survivor of what once was a common truss type on the farm-to-market county road systems in the rural Midwest. According to an Iowa Department of Transportation bridge survey in progress, it is one of only three extant Camelback truss bridges in the state. The bridge serves as a reminder of an era when the counties in Iowa invested significant effort and expense in completing a transportation network to facilitate the shipment of agricultural products from the farm to the nearest distribution center. The proliferation of local bridge fabricating firms was a concurrent phenomenon, represented in this instance by the Fair-Williams Bridge Company of Ottumwa, Iowa. Such nineteenth century companies fabricated and erected inexpensive and serviceable bridges throughout the Midwest.

Project Information: The Boyleston Bridge was documented by Dennett, Muessig, Ryan & Associates, Ltd. (Iowa City, Iowa) for the Henry County, Iowa, Board of Supervisors in August 1984. The project team consisted of J. Ceronie and Marie A. Neubauer, photographers; and Barbara Beving Long and Hans Muessig, historians.

Transmitted by: Jean P. Yearby, HAER, 1985

## HISTORICAL BACKGROUND

During the four decades following the Civil War the face of the Midwest changed dramatically. Immigrants from Europe and the eastern factory cities came west to claim farmland on the prairie between the Mississippi and the Rocky Mountains. In Iowa these people found plentiful and fertile acres.

The population growth in the West after the Civil War was accompanied by, and indeed, accomplished via, a rapid extension of the Nation's rail lines and organization of the road system. Farmers had a great need to get their products to local markets, and distributors to send goods to other regions. The development of the metal truss bridge, an American innovation, stems directly from the need for inexpensive, rapidly constructed bridges for railroads and for farm-to-market roads. Firms specializing in bridge fabrication flourished to meet this need.

The construction, in the last half of 1896, of the bridge at Boyleston, which crosses the Skunk River in southeastern Henry County, Iowa, should be viewed in this context. The major purpose of the bridge was to facilitate the flow of farm products to the county seat, it being much easier for farmers in the southern portion of Henry County to travel to Mt. Pleasant than to make the much longer journey to Fort Madison or Keokuk to the south and east on the Mississippi.

It is uncertain exactly when the agitation for a bridge over the Skunk River began. The site was apparently a ford before the Civil War, and was located on a secondary north-south road between Mt. Pleasant and the river towns of Fort Madison and Keokuk. Following the war, as more farmers settled in Iowa, the Boyleston crossing probably became an important part of the local transportation network.

However, bridges were constructed by the county at four other points on the Skunk before a span was built at Boyleston. The first was built in 1876 at Oakland Mills. This site was probably chosen for the county's first major bridge because it lay on the most heavily travelled north-south road in the county and offered access to several mills. Webster's Ferry, which lay on a direct route south from Mt. Pleasant to Keokuk, was the site of the second county bridge over the river, built in 1883. A third bridge was built in 1886 at Rome, due west of Mt. Pleasant. The town of Lowell, in the southeast portion of the county, received a span in 1889.<sup>1</sup>

The construction of bridges and roads within Henry County was the responsibility of the county government. Funding for bridge and road construction was derived from a tax on the people and property of the county. Between 1887 and 1896 the county supervisors levied taxes of between 10 and 16 mills per year. The tax apportioned for bridges

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<sup>1</sup>Mt. Pleasant Weekly News, July 29, 1896.

during this period amounted to roughly 25 percent of the total tax levy, and expenditures for bridges were an equivalent percentage of the county's costs.<sup>2</sup>

Accompanying the power to tax, the three county supervisors had the authority to determine the location of bridges and roads and to supervise their construction. The Henry County Board of Supervisors normally met five times a year. Four of the meetings were devoted to general county business and one exclusively to canvassing the results of the November general elections.

When the Board received a petition for a bridge, the usual procedure was to refer the matter to the supervisor chosen to head the "bridge committee"<sup>3</sup> with instructions to report at the next meeting. A petition for a bridge at Boyleston was most likely submitted at the June 1889 meeting of the supervisors, although the supervisor's records do not mention this and there are no newspapers extant for that period. In any event the board replied to the petition at the September meeting:

"In the matter of a petition for a bridge over the Skunk River at Boyleston the Board would say that they have given the question of building this bridge a careful consideration. The bonded railroad indebtedness of the county of \$5,500 will be due in 1892, and without increasing the rate of taxation of the county cannot grant the wish of the petitioners. The petition is therefore indefinitely postponed."<sup>4</sup>

It was not unusual for the supervisors to hear petitions for six or more bridges at a single meeting. The vast majority of these were for small bridges across creeks. When a bridge petition was approved, one board member was empowered to supervise the span's construction. From the county treasurer's reports in the records of the supervisor's meetings it appears that the county employed a bridge crew which constructed many of the county's bridges. Most of these bridges were timber, although at least one order for an iron bridge was filled by the King Iron Bridge Company between 1889 and 1896.<sup>5</sup>

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<sup>2</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] D (January 1887 - November 1896)," *passim*.

<sup>3</sup>This position seems to have been an informal one that passed among the supervisors. The chairman of the bridge committee was reimbursed for expenses.

<sup>4</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] D (January 1887 - November 1896)," September 5, 1889, page 158.

<sup>5</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] D (January 1887 - November 1896)," *passim*.

By 1894 the Board of Supervisors appears to have "formalized" the process of determining the coming year's bridge construction. The April meetings in 1894, 1895, and 1896 were all devoted in part to hearing petitions and to visiting probable sites.<sup>6</sup> During the April 1896 meeting, they undoubtedly heard another petition for a bridge over the Skunk River at Boyleston, as well as petitions for two other bridges over the Skunk although the meeting notes do not mention the specific petitions.

At the July 1896 meeting the Board of Supervisors spent three days visiting proposed bridge sites over the Skunk River: at Weimer's and Millspaugh's Mills in the western portion of the county, and at Boyleston in the southern portion of the county. Following this junket, the Board met in Mt. Pleasant to hear formal arguments from the petitioners. The Mt. Pleasant Weekly News reported the deliberations:

"After thirty years of patient petitioning, the people of Jackson Township have a second bridge across the river at Boyleston. At its regular session last Friday, the board of supervisors decided on the location after one of the most exciting contests ever held by the board. Boyleston won on two counts; first the necessity was unquestioned, and again the devotion of those who advocated the bridge was a still more potent factor. Millspaugh's and Weimer's lost because the necessity was not so apparent, while the fierce conflict over the location was really the cause of the defeat for Trenton Township and probably nothing contributed more to the defeat of Weimer's than the uncalled for attack of Perry Crawford upon Miss Millspaugh. From a politic standpoint his abuse of the lady was idiotic; the ethics of good breeding would presume brutal and unpardonable. It probably cost the township the bridge.

After a day spent at Boyleston, Weimer's and Millspaugh's, the board met in regular session to listen to arguments for those interested. Each side secured the services of an attorney. T. M. McAdam appeared for Weimer's. W. I. Babb for Millspaugh's and LeRoy Palmer for Boyleston. Aside from the attorneys, arguments were made by parties directly interested. The hearing lasted all day Thursday. Miss Millspaugh directed the contest for her location and won much admiration for the indomitable courage with which she fought for her interests. Perry Crawford represented Weimer's. He thwarted his own labors by his attempt to bluff everybody into his way of thinking. In his remarks before the Board he accused Miss Millspaugh of dishonesty, misrepresentation, false pretenses and other abuses to the

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<sup>6</sup>Ibid., April 25, 1894, page 372; April 1, 1895, page 432; April 6, 1896, page 494.

disgust of those present. Mr. Crawford's attack on Miss Millspaugh was entirely uncalled for, abusive, insulting and unpardonable. The News is satisfied that he did not reflect the feeling of the good people of Rome and vicinity. They wanted fair play and a fair fight and honestly and honorably worked for the bridge but they will not endorse the ungentlemanly attitude of Mr. Crawford. He misrepresented rather than represented the people interested in the bridge site. Mr. Crawford's attack on Miss Millspaugh, other things being equal, was sufficient to send the bridge to any other location, as the Board was thoroughly disgusted with the exhibition. The strongest plea made before the Board was by Henry Barker for Boyleston. Mr. Barker's heart was in his work and his plea for the bridge had great weight. Before a single bridge spanned the river, Boyleston was petitioning for one and ever since, every time the question had arisen the Boyleston people have again come before the Board, but in vain. At last they have the prize. There is rejoicing in that neighborhood. They have fought hard and deserve victory. The bridge will cross the river at the present ford, will be of iron, consisting of three one hundred and fifty foot spans and two sixty foot spans. There will be stone abutments at the approaches. The cost of the bridge will be less than \$12,000, and possibly as low as \$10,000. One-half of this amount will be expended among the people of the county. The bridge will bring a good deal of trade to Mt. Pleasant that now goes to Ft. Madison and Keokuk. Bridge men are now figuring on the structure and work will be commenced at once.

Apparently representatives of several bridge companies accompanied the supervisors on their tour and sat in on the deliberations held on Friday.<sup>8</sup> For once the Board chose Boyleston, plans for the bridge were prepared that same day with the assistance of the County Surveyor J. A. Schreiner, and the representatives were instructed to submit their bids the next morning!<sup>9</sup>

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<sup>7</sup>Mt. Pleasant Weekly News, July 29, 1896.

<sup>8</sup>No notices were found in the Mt. Pleasant newspapers inviting bridge company representatives on this tour so it is unclear how companies learned of the project. It is likely that the firms were invited by the supervisors by letter.

<sup>9</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] D (January 1887 - November 1896)," July 21 - 24, 1896, page 514.

When the bids were accepted Saturday morning, six companies offered their services. Only one company was from out of the state. The bids were as follows:

Wisconsin Bridge Company, Milwaukee.....	\$10,000.00
Stark Bridge Company, Des Moines.....	\$9,900.00
J. B. Drew & Company, Keokuk.....	\$9,675.00
B. F. Parks, Cedar Rapids.....	\$9,220.00
Clinton Bridge Company, Clinton.....	\$9,109.00
Fair-Williams Bridge Company, Ottumwa.....	\$8,769.00 <sup>10</sup>

The Board awarded the contract to the Fair-Williams Bridge Company with the provision that the bridge be completed by January 1, 1897. The bridge was to consist of three 150-foot steel spans and two 60-foot spans. The abutments were to be stone and the piers steel. The Board was very gratified at the cost of the bridge, and the Mt. Pleasant Weekly News attributed the low bids to three reasons:

"First, the remarkably low price of iron and steel; second, the dull times and the eagerness of the firms to secure work at any price; and third, the county will draw a check for the whole amount the day the bridge is accepted, the money being in the treasury today to pay for it."<sup>11</sup>

There is no mention of the construction of the bridge in the local newspapers during the summer, fall, or winter of 1896. The bridge, however, was apparently completed on time. The minutes of the January 1897 meeting of the Supervisors report that they inspected the new bridge.<sup>12</sup> Fair-Williams, contrary to the original intent of the Board, did not receive final payment for the work until September, 1897.<sup>13</sup>

The bridge is scheduled for replacement in 1985.

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<sup>10</sup>Mt. Pleasant Weekly News, July 29, 1896.

<sup>11</sup>Mt. Pleasant Weekly News, July 29, 1896.

<sup>12</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] E (January 1897 - September 1905)," January 22, 1897, page 29.

<sup>13</sup>"Record [of the] Board of Supervisors, [Henry County] [Book] E (January 1897 - September 1905)," September 8, 1897, page 70.



## ENGINEERING DESCRIPTION

The Boyleston Bridge consists of five steel spans, two 60-foot (18.29 M.) four-panel Pratt pony trusses and three 150-foot (45.72 M.) ten-panel Camelback through trusses. All connections on the five spans are pinned and the deck is wooden. The trusses of both the Camelback and the Pratt spans are 17 feet (5.18 M.) apart. The distance from the bottom to the top chord on the Pratts is 8 feet (2.44 M.) and the panel-to-panel distance is 14 feet 9 inches (4.49 M.). The panel-to-panel distance on the Camelbacks is 15 feet (4.57 M.); the height to the portal is approximately 21 feet (6.40 M.) and to the top chord at the center panel is approximately 28 feet (8.53 M.).<sup>14</sup>

The north and south abutments for the bridge were originally limestone. The south abutment remains intact while the north abutment has been replaced with one made of wooden piles.

The four piers are composed of banded, concrete(?) -filled steel columns, often called Lally columns. These are 5 feet (1.52 M.) in diameter. Each is capped with a circular steel plate, to which the bridge shoes are attached with forged hooks. The two columns of each pier are connected either by a diaphragm of plates extending to the waterline (and below?) or by a set of beams and diagonals.

Because no plans, specifications, or construction descriptions remain it is uncertain how the piers were constructed. The common practice when using Lally columns was to sink a hollow column as far as possible into the river bed and then dredge out the interior. Then iron-tipped wooden piles were driven through the bottom opening of the column and further down into the riverbed. Once these piles were driven as deep as possible the column was filled with concrete. As a result the column served as a form for the concrete, and the piles as the foundation.

The superstructure of the bridge is composed of steel beams, eyebars, and rods. There is nothing unusual about the construction or fabrication techniques, and the riveting and pin details are standard. Fair-Williams appears to have obtained the steel for the bridge from at least two mills, Jones and Laughlin and another mill whose roller mark was "GRMCO". The end posts and top chords of all the spans are built-up of channel beams, plates, and latticing. The major vertical compression members are channel beams with latticing, while the minor members are angle bars and latticing. The floor beams are standard I-beams, as are the floor stringers. All the tension members, the small counters as well as the bottom chord eyebars, are forged steel. As Fair-Williams had a forge by 1896, these could have been provided by the company.

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<sup>14</sup>Vertical distances are only estimated. No original plans are extant and the bridge could not be climbed safely.

## BIOGRAPHICAL: THE FAIR-WILLIAMS BRIDGE COMPANY

The Fair-Williams Bridge & Manufacturing Company of Ottumwa, Iowa was founded in 1887 by J. H. Williams and E. D. Fair. Neither man was new to bridge fabrication or erection. J. H. Williams was born in Pennsylvania in 1840 and by 1880 had started a bridge company in Keosauqua, Iowa. In 1887 he moved to Ottumwa and purchased the Ottumwa Plow Manufacturing Company with E. D. Fair; together they set up the bridge works.

E. D. Fair was also born in Pennsylvania, although the Iowa county histories do not give an exact date. Fair was a carpenter by trade but following the Civil War he served as a contractor doing grade work for the Union Pacific Railroad. In 1869 he moved to Ottumwa and set himself up as a bridge contractor, forming the company with Williams in 1887. The firm was formally incorporated in 1894 as the Fair-Williams Bridge and Manufacturing Company, with Williams as the president.<sup>15</sup>

The company's facilities were located east of downtown Ottumwa on South Vine Street. Sanborn Fire Insurance maps show the growth of the company between 1892 and 1909. In 1892 the complex consisted of a one-story blacksmith shop, a woodworking and paint shop, a stock house, and a warehouse.<sup>16</sup> By 1897 the company had installed a larger stationary engine, built a foundry and a pattern shop, and enlarged the blacksmith shop considerably, now calling it the erecting shop. In addition, the company had a railroad siding adjacent to the erecting shop and the steel yard, testimony to the volume of work the firm was doing.<sup>17</sup> By 1902 the size of the erecting shop had again doubled, making it possible to assemble several 200-foot trusses before they were shipped to a site for erection.<sup>18</sup> A county history of that year reported that the firm employed 40 men.<sup>19</sup>

Sometime prior to 1909 J. H. Williams left the company and Fair reorganized it, first as the LaCrosse Hay Tool Manufacturing Company and finally as the Ottumwa Supply and Construction Company. The latter

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<sup>15</sup>Evans, Capt. S. S., ed. History of Wapello County and Representative Citizens. Chicago: Biographical Publishing Co., 1901, page 201.

<sup>16</sup>Sanborn Fire Insurance Maps, Ottumwa, Iowa 1892. New York: Sanborn-Perris Map Company, 1892., page 3.

<sup>17</sup>Sanborn Fire Insurance Maps, Ottumwa, Iowa 1897. New York: Sanborn-Perris Map Company, Ltd., 1897., page 3.

<sup>18</sup>Sanborn Fire Insurance Maps, Ottumwa, Iowa 1902. New York: Sanborn Map Company, 1902., page 10.

<sup>19</sup>Evans, ibid, page 201.

company remained in business until at least 1925 manufacturing construction and mining equipment, as well as bridge and roof trusses.<sup>20</sup>

The available descriptions of the company state that it was well-known in the upper Midwest and that the firm's bridges could be found in the Dakotas, Nebraska, Kansas, Missouri, Minnesota, and Iowa. In addition to bridge fabrication, the company was also known for its production of roof trusses, architectural iron work, engines, boilers, and coal mining and mill machinery.<sup>21</sup> Messrs. Fair and Williams often travelled in the interests of their company.

The rise and decline of a bridge fabricator such as the Fair-Williams Company probably mirrors similar occurrences throughout the country between the 1880s and the turn of the century. The expansion of American agriculture created a demand for numerous bridges, and local companies like Fair-Williams appeared to meet that demand. The ready availability of steel products made the bridge fabricator and erector's task much easier. Following the turn of the century the demand remained for bridges; if anything, it had grown. However, by this time larger bridge companies, organized on a regional or national scale, began to overshadow the local fabricators; the economies of scale, both in marketing and in fabrication, tended to favor the larger concerns. Small firms like Fair-Williams were either absorbed<sup>22</sup> or they shifted their activities to emphasize other products and services.

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<sup>20</sup>Waterman, Harrison L., History of Wapello County. Chicago: S. J. Clarke Publishing Company, 1914, page 115. See also the Sanborn Fire Insurance Maps for 1909, 1917, and 1925.

<sup>21</sup>Evans, ibid, page 201; Annual Trade Review of the Ottumwa Courier, page 16.

<sup>22</sup>As was the case with nearly a dozen companies in the organization of the American Bridge Company, for example.

RESEARCH NOTE

The following bibliography is a complete listing of the sources consulted regarding the Boyleston Bridge and the Fair-Williams Company. No original plans or specifications of the bridge were found at the Henry County Courthouse and none are thought to exist. The Board of Supervisor's record books are extant but not overly useful. Finally, the newspapers of Mt. Pleasant yielded very little information other than a report of the July 1896 meeting. Of the three newspapers published in the county seat, only one could be read, the other two being in an advanced state of deterioration.

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